

NATIONAL ROUND ROBIN - 9

TOSS-UP

1. ERSC; Multiple Choice: The largest group of rock-forming minerals consists of the

(W) quartzes.
(X) halides.
(Y) silicates.
(Z) oxides.

ANSWER: Y-- SILICATES

BONUS

1. ERSC; Short Answer: What basin in West Texas has yielded the greatest amount of oil from upper Paleozoic formation in the Western U.S.?

ANSWER: PERMIAN

TOSS-UP

2. BIOL; Multiple Choice: Parasitism is a type of

(W) commensalism.
(X) mutualism.
(Y) predation.
(Z) symbiosis.

ANSWER: Z-- SYMBIOSIS

BONUS

2. BIOL; Multiple Choice: The symbiotic relationship between sea anemones and shrimp is an example of

(W) mutualism.
(X) parasitism.
(Y) commensalism.
(Z) parasitism.

ANSWER: Y-- COMMENSALISM

TOSS-UP

- 3. COMP; Multiple Choice: In the JAVA language, the output of a JAVA compiler is known as what type of file?**

(W) a class file
(X) a method file
(Y) a pseudo-binary file
(Z) an object-oriented program

ANSWER: W-- A CLASS FILE

BONUS

- 3. COMP; Multiple Choice: Which of the following is a method for diagonalization of large matrices?**

(W) Graham-Schmidt orthogonalization
(X) Spline projection
(Y) Bessel's method
(Z) Lanczos' algorithm (pron: lan-sole)

ANSWER: Z-- THE LANCZOS' ALGORITHM

TOSS-UP

- 4. PHYS; Multiple Choice: Fundamental tones always have the**

(W) lowest possible overtones.
(X) highest possible overtones.
(Y) lowest possible pitch.
(Z) highest possible pitch.

ANSWER: Y-- LOWEST POSSIBLE PITCH

BONUS

- 4. PHYS; Multiple Choice: The property of sound that increases when sounds get louder is**

(W) frequency.
(X) pitch.
(Y) intensity level.
(Z) wavelength.

ANSWER: Y-- INTENSITY LEVEL

TOSS-UP

5. **GENR; Short Answer:** Which prefix is often used with scientific terms to indicate that something is the same, equal or constant?

ANSWER: ISO

BONUS

5. **GENR; Multiple Choice:** The study of how people use tools to perform work and how people physically relate to their working environment is called

(W) engineering.

(X) ergonomics.

(Y) agronomy.

(Z) physiology.

ANSWER: X-- ERGONOMICS

TOSS-UP

6. **CHEM; Multiple Choice:** Who first proposed the concept of free energy?

(W) Hess

(X) Dalton

(Y) Gibbs

(Z) Lavoisier

ANSWER: Y-- GIBBS

BONUS

6. **CHEM; Multiple Choice:** The maximum work that a spontaneous process can provide is given by

(W) delta S.

(X) delta G.

(Y) delta H.

(Z) delta T.

ANSWER: X-- DELTA G

TOSS-UP

7. ASTR; Multiple Choice: The local group of galaxies contains

- (W) The Milky Way and three large elliptical galaxies.
- (X) Hundreds of large and small galaxies.
- (Y) Three spiral galaxies and a number of smaller galaxies.
- (Z) Six large spiral galaxies.

ANSWER: Y-- THREE SPIRAL GALAXIES AND A NUMBER OF SMALLER GALAXIES

BONUS

7. ASTR; Multiple Choice: The Hubble Space Telescope found evidence for a black hole at the center of several galaxies by measuring

- (W) The emission of X-rays.
- (X) The size of the galaxy's nucleus.
- (Y) Gravitational density waves near the galaxy's center.
- (Z) The rotational velocity of stars near the galaxy's center.

ANSWER: Z-- THE ROTATIONAL VELOCITY OF STARS NEAR THE GALAXY'S CENTER

TOSS-UP

8. BIOL; Multiple Choice: A species that grows exponentially for some time and then suddenly crashes is showing a

- (W) delayed logistic growth curve.
- (X) boom and bust growth curve.
- (Y) delayed exponential growth curve.
- (Z) logistic growth curve.

ANSWER: X-- BOOM AND BUST GROWTH CURVE

BONUS

8. BIOL; Multiple Choice: The first, and perhaps the best known, case of biological magnification involved the pesticide

- (W) PCB.
- (X) Dieldrin.
- (Y) NO.
- (Z) DDT.

ANSWER: Z-- DDT

TOSS-UP

9. **MATH; Multiple Choice:** If an integrand contains the square root of a combination of a constant and the square of the integration variable, a helpful technique for evaluating the integral is known as

(W) integration by parts.
(X) integration by trig substitution.
(Y) double integration.
(Z) antidifferentiation.

ANSWER: X-- INTEGRATION BY TRIG SUBSTITUTION

BONUS

9. **MATH; Multiple Choice:** In terms of factorials, how many 9 digit numbers are there with all digits different?

(W) 10! (10 factorial)
(X) 9×9 (read 9 times 9 factorial)
(Y) 9
(Z) 9×8

ANSWER: X-- 9×9

TOSS-UP

10. **PHYS; Multiple Choice:** Electromagnetic waves differ from other waves because they

(W) cause the molecules of a medium to vibrate.
(X) are transverse waves.
(Y) can travel in a vacuum.
(Z) travel slowly.

ANSWER: Y-- CAN TRAVEL IN A VACUUM

BONUS

10. **PHYS; Multiple Choice:** The radio waves with the highest frequencies are

(W) TV channels.
(X) AM radio.
(Y) FM radio.
(Z) microwaves.

ANSWER: Z-- MICROWAVES

TOSS-UP

11. CHEM; Multiple Choice: Exothermic reactions are

- (W) always spontaneous.**
- (X) usually spontaneous.**
- (Y) usually not spontaneous.**
- (Z) never spontaneous.**

ANSWER: X– USUALLY SPONTANEOUS

BONUS

11. CHEM; Multiple Choice: The degree to which reactions proceed to completion is due to

- (W) equilibrium.**
- (X) kinetics.**
- (Y) dynamics.**
- (Z) composition.**

ANSWER: W– EQUILIBRIUM

TOSS-UP

12. COMP; Multiple Choice: An operating system designed to support large networks is called Windows NT. What does NT stand for?

- (W) Network topology**
- (X) Network technology**
- (Y) New topology**
- (Z) New technology**

ANSWER: Z– NEW TECHNOLOGY

BONUS

12. COMP; Multiple Choice: The Macintosh operating system includes an important program, a file manager, which manages the desktop screen icons. This is called

- (W) a help menu.**
- (X) active assistance.**
- (Y) the Finder.**
- (Z) none of the above**

ANSWER: Y– THE FINDER

TOSS-UP

13. BIOL; Multiple Choice: The toxic metals dissolved by acid rain do not

- (W) accumulate in the food chain.**
- (X) reach dangerous levels by biological magnification.**
- (Y) include aluminum and mercury.**
- (Z) result in water with a high pH.**

ANSWER: Z-- RESULT IN WATER WITH A HIGH pH

BONUS

13. BIOL; Multiple Choice: The main source of harmful chlorofluorocarbons in the United States today is

- (W) aerosol propellants.**
- (X) medical wastes.**
- (Y) refrigeration equipment.**
- (Z) sewage.**

ANSWER: Y-- REFRIGERATION EQUIPMENT

TOSS-UP

14. ASTR; Multiple Choice: The end of the main sequence life of a star like our Sun occurs when

- (W) the proton-proton cycle for hydrogen fusion is replaced by the carbon cycle.**
- (X) 90% of the star's hydrogen is fused into helium.**
- (Y) the core of the star contracts to form an electron degenerate gas.**
- (Z) the fusion of hydrogen into helium stops in the core of the star.**

ANSWER: Z-- THE FUSION OF HYDROGEN INTO HELIUM STOPS IN THE CORE OF THE STAR

BONUS

14. ASTR; Multiple Choice: If all the hydrogen in the Sun was fused to helium, what fraction of Sun's mass would be lost?

- (W) 0.0001**
- (X) 0.007**
- (Y) 0.1**
- (Z) 0.25**

ANSWER: X-- 0.007

TOSS-UP

15. PHYS; Multiple Choice: Light produced from heat is called

- (W) illuminated.
- (X) fluorescent.
- (Y) incandescent.
- (Z) neon.

ANSWER: Y– INCANDESCENT

BONUS

15. PHYS; Multiple Choice: A candle flame is seen because it is

- (W) illuminated.
- (X) refracted.
- (Y) coherent.
- (Z) luminous.

ANSWER: Z– LUMINOUS

TOSS-UP

16. CHEM; Multiple Choice: A reaction is likely to be spontaneous if, compared to products, reactants are

- (W) higher in heat content.
- (X) of equal energy.
- (Y) lower in energy.
- (Z) higher in energy.

ANSWER: Y– LOWER IN ENERGY

BONUS

16. CHEM; Multiple Choice: Types of crystalline solids include all of the following except

- (W) metallic.
- (X) covalent-network.
- (Y) molecular.
- (Z) nonmetallic.

ANSWER: Z– NONMETALLIC

TOSS-UP

17. ERSC; Multiple Choice: What kind of rocks are formed by lava that cools quickly?

- (W) Extrusive metamorphic
- (X) Extrusive igneous
- (Y) Intrusive metamorphic
- (Z) Intrusive igneous

ANSWER: X-- EXTRUSIVE IGNEOUS

BONUS

17. ERSC; Short Answer: The process of accumulation of bits of matter around an initial mass is called

ANSWER: ACCRETION

TOSS-UP

18. GENR; Short Answer: Identify the tree family that includes among its members the: fink, myrtle, turkey, jacks, laurel, white, live and pin.

ANSWER: OAK (ACCEPT QUERCUS)

BONUS

18. GENR; Multiple Choice: Which of the following vacuum pumps operates by using a very cold surface to trap the gases on the cold surface?

- (W) Sublimation pump
- (X) Turbo pump
- (Y) Cryopump
- (Z) Diffusion pump

ANSWER: Y-- CRYOPUMP

TOSS-UP

19. PHYS; Multiple Choice: Ultraviolet photons are released in light that is

- (W) incandescent.
- (X) fluorescent.
- (Y) luminous.
- (Z) neon.

ANSWER: X-- FLUORESCENT

BONUS

19. PHYS; Multiple Choice: The item not associated with fluorescent light is

- (W) a tungsten filament.
- (X) a phosphor.
- (Y) an ultraviolet photon.
- (Z) a mercury vapor atom.

ANSWER: W-- A TUNGSTEN FILAMENT

TOSS-UP

20. BIOL; Multiple Choice: A nerve cell becomes depolarized when the

- (W) potassium gates open.
- (X) sodium gate opens.
- (Y) sodium gates close.
- (Z) both sodium and potassium gates open.

ANSWER: X-- SODIUM GATE OPENS

BONUS

20. BIOL; Multiple Choice: The impulse that travels along the nerve membrane is

- (W) an action potential.
- (X) a resting potential.
- (Y) a chemical current.
- (Z) an electric current.

ANSWER: W-- AN ACTION POTENTIAL

TOSS-UP

- 21. CHEM; Short Answer: In September 1997 the International Union of Pure and Applied Chemistry assigned names to the elements 104 through 109. Give any four of the new names.**

ANSWER: RUTHERFORDIUM, DUBNIUM, SEABORGIUM, BOHRIUM, HASSIUM, MEITNERIUM

BONUS

- 21. CHEM; Multiple Choice: Which of the following types of crystalline solids would you expect to have the highest melting temperatures?**

**(W) Molecular
(X) Ionic
(Y) Network-covalent
(Z) Metallic**

ANSWER: Y-- NETWORK-COVALENT

TOSS-UP

- 22. PHYS; Short Answer: A machine's output is 4000 joules and its frictional losses are 1000 joules. What percent is its efficiency?**

ANSWER: 80 (PERCENT)

BONUS

- 22. PHYS; Multiple Choice: An object that is seen only by means of reflected light is said to be**

**(W) luminous.
(X) incandescent.
(Y) illuminated.
(Z) fluorescent.**

ANSWER: Y-- ILLUMINATED

TOSS-UP

23 MATH; Short Answer: Which number does NOT fit in the following series

1, 3, 7, 15, 31, 63, 85, 127

ANSWER: 85

BONUS

23 MATH; Short Answer: A cube has a volume of 64 cubic units. How many units are in the sum of the lengths of all its edges?

ANSWER: 48

TOSS-UP

24 BIOL; Short Answer: The “false” ribs are not attached directly to the sternum. Of the 12 ribs, how many are “false” ribs?

ANSWER: 5

BONUS

24 BIOL; Multiple Choice: The tiny ear bone that vibrates against the thin membrane covering the oval window is the

(W) malleus.

(X) incus.

(Y) otolith.

(Z) stapes.

ANSWER: Z-- STAPES

TOSS-UP

25. CHEM; Short Answer: How many karats is pure gold?

ANSWER: 24

BONUS

25. CHEM; Multiple Choice: What is the characteristic feature of a metallic crystal?

- (W) The metallic bond is directional.**
- (X) The bonding forces are weak.**
- (Y) The valence electrons move around the positive ion.**
- (Z) The positive ion is free to move.**

ANSWER: Y-- THE VALENCE ELECTRONS MOVE AROUND THE POSITIVE ION